Name_____

Gas Law Stiochiometry
Pre AP

You will need to complete on a separate sheet of paper. Show all work including units or no credit will be given.

1. Balance the following rxn:

   ___LiCl(s) + ___$MgSO_4$(s) → ___Li_2SO_4 + ___$MgCl_2$

If you started with 15.0g of LiCl, how many grams of $MgSO_4$ would you need to complete the rxn?

2. Methane (CH_4) burns with O_2 to form carbon dioxide (CO_2) and water vapor (H_2O). If 20.0g of CH_4 was mixed with 30.0 g of O_2 in a closed container and ignited:
   a. What would be the limiting reagent?
   b. How much excess reagent would be left over?
   c. How much CO_2 would be made?
   d. How much H_2O would be made?

3. Given carbon dioxide occuping 5.5 L at 5°C and 0.74 atm.
   a. Find moles of carbon dioxide
   b. Now find mass of carbon dioxide

4. How many grams of $AlCl_3$ must decompose in order to produce 3.10L of Cl_2 at 50.0°C and 98.4 kPa? (HINT: Find moles of Cl_2 the grams of $AlCl_3$)

   $2AlCl_3 \rightarrow 2Al + 3Cl_2$

5. What volume of nitrogen can be produced by the decomposition of 50.0 g of NH_4NO_2 at 25°C and 1.20 atm? (HINT: Find moles N_2 of form grams of NH_4NO_2.)

   $NH_4NO_2 \rightarrow N_2 + 2H_2O$

6. Given the following <u>unbalanced</u> chemical equation for the rxn of Na and $Cl_{2(g)}$:

   ___$Na_{(s)}$ +___ $Cl_{2(g)}$→ ___$NaCl_{(s)}$

   What volume of chlorine gas, measured at STP, is necessary for the complete rxn of 4.81g of Na.

7. Balance the below rxn.

   ___$C_3H_{8(g)}$ +___$O_{2(g)}$ →___$CO_{2(g)}$+___$H_2O_{(g)}$

   a. What volume of oxygen gas at 25˚C and 1.04 atm is needed for the complete combustion of 5.53 g of propane?

8. Potassium permanganate, $KMnO_4$, is produced commercially by oxidizing aqueous potassium manganate, K_2MnO_4.

   ___ $K_2MnO_{4\,(g)}$ +___$Cl_{2(g)}$→___ $KMnO_{4\,(g)}$+___$KCl_{(g}$

   a. Balance the above rxn.
   b. What volume of Cl_2(g), measured at STP, is needed to produce 10.0g of $KMnO_4$?

9. If water is added to magnesium nitride, ammonia gas is produced when the mixture is heated.

   ___$Mg_3N_{2(g)}$ +___ $H_2O_{(g)}$ →___$MgO_{(g)}$ +___$NH_{3(g)}$

   a. Balance the above reaction.
   b. If 10.3g of magnesium nitride is treated with 10.3 g of water, what volume of ammonia gas would be collected at 24˚C and 752 mmHg?

Name_____

Key

1. 2:1:1:1 0.177mol
2. a) O2 b) 0781mol c) 0.496mol d) 0.9375mol
3. a) 0.178mol b) 7.83g
4. 10.09g
5. 15.93L
6. 2:1:2 2.34L
7. 1:5:3:4 2.95L
8. 2:1:2:2 0.71L
9. 1:3:3:2 5.07L